VERSATILE, HIGH PRECISION STEREO POINT TRANSFER DEVICE

SEPTEMBER - OCTOBER 1963

PROGRESS REPORT

JOB #552

GENERAL

The work in this reporting period has been to complete preliminary design studies, advance the hardware layouts and to order long lead items where possible. The comments are organized under major sub-assemblies.

1. OBJECTIVE ASSEMBLY

Several optical configurations have been arranged and studied so that the lens locations are compatible with the mechanism and structure. The objective lens has been selected, giving the following approximate system magnifications.

Objective Lens Magnification	System Magnification at 6x Eyepiece	Field of View (Inches)
.38x	1.6x - 6.8x	2.74 - .64
1x	4.2x - 18x	1.04 - .24
2.6 x	11x - 47x	.39 - .093
8x	33x - 144x	.133 - .030

Optical layout of objective assembly will become firm during November.

.375" / 1.67

tan α .224

.276

6x

1.656

25°

FC — .75" — Zoom 1.7x to 3x — .38x

.75" / .7x.38 = 2.74

2. EYEPIECE ASSEMBLY

Design work of the eyepiece assembly has been completed, and detailing has been started. Castings, lenses and mirrors of this assembly will be defined first so that their delay will not impede assembly. The optical configuration and features described last month remains unchanged.

3. FRAME ASSEMBLY

Overall configuration is firm with small design adjustments now taking place. All features described in last report have been retained, but component attachment points, clearances and machining aids are being modified.

4. X-Y CARRIAGES

Use of alloy iron casting has given much needed stiffness to the X axis carriage design. The Y axis carriage is an aluminum alloy casting however, to minimize the moving load, and therefore, deflection seen by the X carriage. Parts have been released for manufacture, although small design changes are still in progress.

5. LEAD SCREWS

Screw configuration is firm, however, release for manufacture will take place in November because design of adjacent mechanisms is not fixed.

6. SCAN DRIVE ASSEMBLY

Slo-Syn motors used in scanning drive have been breadboarded with the anticipated load and driving circuitry. Characteristics of the oscillator is being studied so that magnification feedback can be properly designed. Motor power output appears adequate throughout speed range for the loads calculated, however, electro-mechanical resonances have been noticed, causing rough performance at some stepping frequencies. This disturbance is being studied for remedy to foster vibrations free performance.

7. MEASURING SYSTEM

The pulse generator and electro-mechanical counter have been selected and tested. With the circuits used to limit contact voltage and coil heating the counter can be driven well beyond normal count rate successfully. One count will correspond to 1 millimeter of carriage motion. Counter features arbitrary setting, zero reset and bidirectional counting capability. The five digit numerical display of counter will remain as supplied, and will probably be positioned on or near the writing top for convenient readout and adjustment.

8. LIGHT TABLE AND FILM DRIVE

Breadboard of vacuum film holddown has shown much promise in that pulldown time and physical limitations are compatible with system requirements. Techniques in minimizing friction with advancing film and leakage will have to be developed. Microgrooves in the glass plate below film will be evacuated by adjustable spring mounted manifolds; adjustment for film width, spring mounted to assure vacuum sealing. Manifolds are on top of films' edges so that film curl is restrained, and therefore, vacuum sealing is maintained. Vacuum film holddown configuration is not firm, but design should be completed before next report. Film drive is firm with parts being detailed and prepared for November release.

8. LIGHT TABLE AND FILM DRIVE (Contd.)

Mechanical features described in last report remains unchanged except that 35mm film is not to be used in this equipment.

9. LOOP FORMING MECHANISMS

Design and detailing almost complete with November release for manufacture is certain. All features described in last report remains.

The following are conclusions made at a meeting with customer's personnel at [redacted] on September 13, 1963. STAT

A. Increase in cabinets' length to 84 inches acceptable. This will include film spools formerly mounted externally to cabinet.

B. Film loading schemes will be examined so that more rapid exchange of spools is permitted.

C. Longer leader length, approximately 11 feet long, needed for new cabinet configuration is acceptable.

D. Positioning accuracy design goal of Model 552 is .0001 inch per inch of travel, accumulative.

E. Height of writing top is to be approximately 33 inches from floor.

F. Eyepiece optical configuration acceptable, omitting strabism adjustment.

G. Eyepiece suspension to be counterbalanced to prevent injury or equipment damage.

STAT H. [redacted] will determine if maximum design scanning speed of 1 inch/second will be satisfactory. However, present design is progressing with 1 inch/second scanning speed.

I. 130 degree Fahrenheit maximum film temperature, not 90 degree plus ambient, is now desired.

J. Brightness and color temperature at eyepiece will be determined by customer.

10. WORK TO BE PERFORMED DURING NEXT REPORTING PERIOD

A. Complete objective assembly optical and nechanical configuration.

B. Complete eyepiece assembly, detailing and release for manufacture.

C. Complete frame and carriage assembly releases for manufacture.

D. Purchase all long lead items.

E. Complete development work on scanning drive mechanism and electronics.

F. Complete laser marking optics.

G. Define vacuum holddown scheme and design hardware.